[CMSC 425/525] In-Class: Graph Coverage

Dr. Kosta Damevski

Consider the following graph and test paths.

```
N  = { 1, 2, 3, 4, 5, 6, 7, 8 }
N0 = { 1 }
Nf = { 8 }
E  = { (1, 2), (2, 3) (2, 8), (3, 4), (3, 5),
       (4, 3), (5, 6) (5, 7), (6, 7), (7, 2) }
```

```
t1 = [1, 2, 8]
t2 = [1, 2, 3, 5, 7, 2, 8]
t3 = [1, 2, 3, 5, 6, 7, 2, 8]
t4 = [1, 2, 3, 4, 3, 5, 7, 2, 8]
t5 = [1, 2, 3, 4, 3, 4, 3, 5, 6, 7, 2, 8]
t6 = [1, 2, 3, 4, 3, 5, 7, 2, 3, 5, 6, 7, 2, 8]
```
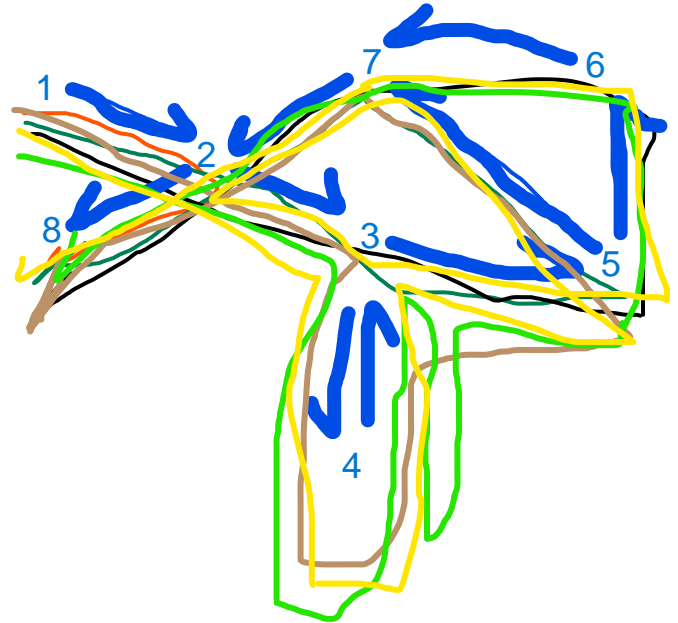
1. Give a minimal set of test paths that achieve node coverage.

2. Give a minimal set of test paths that achieve edge coverage.

3. Identify all the edge pairs (14).

4. Give a minimal set of test paths that achieves edge-pair coverage. Are any edge-pairs missed?

5. Identify all the prime paths (19).

6. Give a minimal set of test paths that achieves prime-path coverage. Are any prime paths missed? Do sidetrips help?

1. {t5}

2. {t6}

3. {1,2,3}{1,2,8}{2,3,4}{2,3,5}{3,4,3}{3,5,6}{3,5,7}{4,3,5}{4,3,4}{5,6,7}{5,7,2}{6,7,2}{7,2,8}{7,2,3}

4. {t1}{t5}{t6}
   There are no edge pairs missing

5. {1, 2, 3, 5, 7, 2, 8} {1,2,3,5,6,7,2,8} {1,2,8} {1,2,3,4} {3,4,3} {3,5,7,2,3} {3,5,6,7,2,3} {4,3,4} {4,3,5,7,2,8} {4,3,5,6,7,2,8} {5,7,2,3,5} {5,7,2,3,4} {5,6,7,2,3,5} {5,6,7,2,3,4} {6,7,2,3,5,6} {7,2,3,5,7} {7,2,3,5,6,7}

6. {t2}{t3}{t1}{t6}{t5}{t4}
   missed: {3,5,6,7,2,3}, {4,3,5,6,7,2,8} {5,7,2,3,4} {5,6,7,2,3,5} {5,6,7,2,3,4}
   {6,7,2,3,5,6} {7,2,3,5,7}